REMARKS

Interview

The Examiner is thanked for courtesies extended in granting an interview in the above captioned application to Dr. James Baker and Dale Bjorkman on April 14, 2005. During this interview, the history of advances in toner technology, particularly in the use of amphipathic copolymers in toners in the past and in currently pending patent applications, was discussed. The differences between copolymers prepared in aqueous media either as a suspension or emulsion polymerization reactions and amphipathic copolymers prepared in solvents as described in the present application were also discussed. The different development stages and toner discoveries for use in different printing processes were also discussed. Early systems were described having toner particles with very low Tg polymers that were imaged and adhesively transferred by an adhesive overlaminate sheet. Liquid toners, including gels, were also discussed that comprised mid-range Tg toner particles that were formed as a film on the photoreceptor and transferred as a film and subsequently fused to a substrate. Phase change toner systems were also discussed, wherein a toner is provided in a system that is solid at room temperature, but which is converted to a liquid toner, for example by heating, prior to imaging. The imaging process in the phase change toner system thus is a liquid toner system.

Issues related to creation of dry toner particles from toner particles prepared in liquids, and issues related to printing from liquid toner compositions without film formation on the photoreceptor were also discussed.

Amendments

Claims 1, 16, 20, 21 and 23 have been amended to insert language regarding the S and D material portions of the amphipathic copolymer. Antecedent basis for this amendment is found throughout the specification, for example at page 7, lines 19-29 and page 16, lines 5-7. In addition, new claims 25-27 have been added. Support for these claims is found throughout the specification, for example, at page 31, lines 16-21. Claims 11 and 15 have been canceled.

Additional amendments to the claims are clerical in nature.

Upon entry of the present amendments, claims 1-10, 12-14 and 16-27 will remain pending and under consideration in this application.

It is respectfully submitted that no new matter is introduced by these amendments.

Claim Rejections – 35 U.S.C. §112

Claim 1 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite based upon use of the terms S and D. As suggested by the Examiner, Claim 1 has been amended to relate the terms S and D to the carrier liquid used to make the dry toner particle.

Claims 9-15 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite based upon use of the term PCC. Claims 9-15 have been amended to replace the term "PCC" with "polymerizable, crystallizable compound" to be consistent with terminology in the remaining claims.

In light of the above, Applicants submit the rejections under 35 U.S.C. §112, second paragraph, have been overcome.

Claim Rejections – 35 U.S.C. §103

Claims 1-24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Baker (U.S. Patent No. 6,649,316) in view of Tan (U.S. Patent No. 5,264,315) and Japan 05-119529. Applicants respectfully disagree for the reasons set forth below and request reconsideration.

As an initial matter, Applicants have obtained an English language translation of JP 05-119529. A copy of the translation is enclosed. The translation is also cited in the concurrently filed supplemental Information Disclosure Statement. Since JP 05-119529 has already been made of record in this application, it is believed that no fee is due for consideration of the translation.

The claimed invention is significant in providing dry toner particles derived from an organosol comprising an amphipathic copolymer that is polymerized in situ. It is believed that the D portion of the amphipathic copolymer will tend to physically and/or chemically interact with the surface of visual enhancement additives (such as colorants), while the S portion helps promote dispersion in the liquid carrier without use of a separate surfactant or dispersant. The dispersion is then dried to the desired degree to provide composite dry, free-flowing toner particles. Resultant dry toner particles have a tight particle size distribution and are appropriately sized to function as a dry toner without requiring additional comminution or classification.

Another feature of the claimed invention involves incorporation of one or more polymerizable, crystallizable compounds in the D and/or S portions of the amphipathic

copolymer. Surprisingly, the lower fusing temperature characteristic of some embodiments of the invention is observed even when the polymerizable, crystallizable compound is located in the D portion. Inclusion of the polymerizable, crystallizable compound in the D portion is not only technically surprising, but it can provide surprising effects of the overall toner composition. Inclusion of the polymerizable, crystallizable compound in the D portion can provide an anti-blocking effect. This is surprising, since the D portion of the copolymer is not a crystallizable side chain and is therefore not as readily exposed to and solvated in the liquid carrier as the S portion of the copolymer. Further, it is unexpected that the S portion of the copolymer does not interfere with the anti-blocking benefit. It is also surprising that the polymerizable crystallizable compounds can be included in the D portion without adversely affecting properties of the amphipathic copolymer. The polymerizable crystallizable compounds tend to be soluble in nonaqueous liquid carriers; thus, inclusion of a soluble component in the otherwise dispersed D portion may be expected to adversely impact solubility characteristics of the copolymer, particularly by increasing solubility of the D portion to the point where a relatively high viscosity solution polymer, rather than a relatively low viscosity dispersion polymer (organosol), is obtained.

The primary reference Baker U.S. Pat. No. 6,649,316 (hereafter the "Baker '316 patent") describes a phase change developer comprising: (a) a carrier having a Kauri-Butanol number less than 30; and (b) an organosol comprising a graft (co)polymeric steric stabilizer covalently bonded to a thermoplastic (co)polymeric core that is insoluble in said carrier, wherein said (co)polymeric steric stabilizer comprises a crystallizing polymeric moiety that independently and reversibly crystallizes at or above 30°C, wherein said phase change developer has a melting point at or above 22°C.

As noted in the Baker '316 patent beginning at column 11, line 52, the term "phase change developer" has an accepted meaning within the imaging art. As the term indicates, the developer system is present as one physical phase under storage conditions (for example, usually a solid) and transitions into another phase during development (usually a liquid phase), usually under the influence of heat or other directed energy sources. Thus, in the system as described in the Baker '316 patent, the toner is converted from a solid form to a liquid form prior to development, so that the toner as described first is in the solid form, and then through a specific

manipulation is converted to liquid form under image formation conditions so that the actual image formation process is carried out in the form of a liquid. See column 2, lines 21-25.

There are significant differences between the toner compositions described in the Baker '316 patent and the present claims. It is a claimed feature of the present claims that one or more of the D portions comprises one or more polymerizable, crystallizable compounds (claims 1, 16, 20, 21 and 23). In contrast, the Baker '316 patent describes inclusion of a crystallizing polymeric moiety in the (co)polymeric steric stabilizer (see Abstract, Column 5, lines 3-6). The graft stabilizer (also referred to as the "shell" in the Baker '316 patent, see column 4, lines 64-67) "should have a Hildebrand Solubility Parameter closely matching that of the carrier to ensure that the stabilizer will be sufficiently solubility [sic] in the carrier when the carrier is in its liquid state" (see column 5, lines 23-28). The Baker '316 patent states, "Improved blocking resistance is observed when the PCC is a major component of the graft stabilizer, preferably greater than 45% by weight of the graft stabilizer is the PCC, more preferably greater than or equal to 75%, most preferably greater than or equal to 90%" (see column 6, lines 47-51). The Baker '316 patent therefore does not teach or suggest a toner composition that includes one or more polymerizable, crystallizable compounds in the D material portion as presently claimed.

Further, newly presented claim 25 recites dry electrophotographic toner particles having a volume mean particle diameter in the range of 0.5 to 30 microns. This claim limitation highlights the distinction between the dry toner particles of the present invention, as compared to the phase change toner developer described in the Baker '316 patent.

Neither Tan (U.S. Patent 5,264,315) (hereafter the "Tan '315 patent") nor the JP 05-119529 publication cures the deficiencies of the Baker '316 patent. Neither the Tan '315 patent nor the JP 05-119529 publication describes an amphipathic copolymer as claimed. It is true that the JP 05-119529 publication does describe a graft copolymer. However, there are many different types of graft copolymers, and not all have S and D portions as claimed. Indeed, the graft copolymer described in the JP 05-119529 publication does not. The JP 05-119529 publication describes an approach in which emulsion polymerization is used. All of the monomers used in the JP 05-119529 publication are soluble in the organic phase. This is a homogeneous polymerization that necessarily lacks the combination of S and D portions as claimed.

Thus, even if one were to use the graft copolymer described in the JP 05-119529 publication in the phase change developer described in the Baker '316 patent, the resultant combination would lack an amphipathic copolymer as claimed. Even further, without teaching of an amphipathic copolymer, there can be no teaching or suggestion of inclusion of a polymerizable, crystallizable compound in the D portion of the amphipathic copolymer as claimed.

The Tan '315 patent also fails to teach an amphipathic copolymer having S and D portions as claimed. It is true that the Tan '315 patent describes oil in water polymerization to produce particles having a core/shell structure. However, this is not accomplished using an amphipathic copolymer. Instead, the systems described in the Tan '315 patent use, in practical effect, two classes of monomers. First, one class is used to form a shell generally at the interfacial boundary between the dispersed oil phase and the surrounding aqueous phase. The result is encapsulated droplets. Then, the polymerizable material in the encapsulated droplets is polymerized to form a core. Clearly, the core and shell components described in the Tan '315 patent are not derived from an amphipathic copolymer having S and D portions as claimed.

Thus, even if one were to use the shell/core particles of the Tan '315 patent in the phase change developer of the Baker '316 patent, the resultant combination would lack an amphipathic copolymer as claimed. Even further, without teaching of an amphipathic copolymer, there can be no teaching or suggestion of inclusion of a polymerizable, crystallizable compound in the D portion of the amphipathic copolymer as claimed.

In view of these remarks, withdrawal of the rejection of claims 1-24 over the proposed combination of the Baker '316 patent with the Tan '315 patent and the JP 05-119529 publication is respectfully requested. Moreover, as discussed above, newly presented claims 25-27 also recite toner particles derived from an organosol comprising an amphipathic copolymer that incorporates one or more polymerizable, crystallizable compounds. These claims are patentable over the cited references for at least the same reasons discussed above.

Provisional Rejection – Obviousness-Type Double Patenting

Claims 1-24 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-53 of copending Application No. 10/612,243.

Enclosed herewith is a terminal disclaimer. Applicants submit the rejection has been overcome.

CONCLUSION

In view of the above remarks and amendments, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office action. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues remaining in the application, the Examiner is invited to contact said attorney at (651) 275-9836.

Respectfully Submitted,

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